ABSTRACT OF THE DISCLOSURE

Systems, methods, and vessels for reducing the stagnation and non-uniform flow or treatment of solid materials and slurries in vessels. The non-uniform flow or treatment that may characterize the storage or treatment of solid materials in process industries is minimized or eliminated by the introduction of liquid to the bottom heads of the vessels, in particular, the introduction of liquids in regions in the bottom heads where friction and compression cause stagnation in the flow of material. The liquid may be introduced by means of one or more nozzles, for example, one or more evenly-spaced nozzles, and the flow of liquid to each nozzle may be individually controlled. Though the systems, methods, and vessels disclosed may be used in the processing of cellulose materials, aspects of the present invention may be used in any process or materials handling industry application where solid materials or slurries are handled in vessels.